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GUIDE

TO THE

GERMAN EDUCATIONAL
EXHIBITION

IN ST.-LOUIS 1904



BERLIN

PRINTED BY W. BÜXENSTEIN

1904

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GUIDE
TO THE
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The object of the German Educational Exhibition is to give a clear idea of the forms, equipment, organisation and results of the whole German educational system by means of a selection of typical exhibits suitable for the purpose. The exhibition consists of five great departments of which detailed accounts are given in five separate catalogues. The first of these departments comprises the German Universities and other Scientific Institutions and contains the writings of the Academies of Sciences, exhibits sent from the German excavations now proceeding in Germany itself and in foreign lands, plans, photographs and models of the Universities and Technical Colleges; and finally Zoology and Botany. The second department is devoted to Chemistry, the third to Scientific Instruments, the fourth to exhibits illustrating the System of Instruction and Apparatus used in Teaching in certain selected departments of Medicine, and the fifth to Elementary and Advanced Education.

The whole exhibit covers an area of 4400 sq. meters: but, as no single building of this size could be placed at our disposal, the Chemistry Department, occupying about 1000 sq.m., has been housed in the Electricity Building, and the rest of the Exhibition in the Educational Building.

This "Guide to the German Educational Exhibit" first deals with the Chemistry Exhibit in the Electricity Building. The map attached shows on the front side the plan of the exhibits in the Electricity Building, on the other side the plan of those in the Educational Building.

I. Electricity Building.

Chemistry.

Entering at the S. E. main entrance to the Electricity Building, one sees on the right two entrances to the Chemistry Exhibit. The official representatives of the Chemistry Department may be consulted in the two adjoining bureaus. First the visitor enters a reading-room, which contains in two cases a collection of the German Chemical Literature of ancient and modern times, a Collection of about 3000 Dissertations, and Chemical newspapers, such as the *Chemikerzeitung*, *Chemische Zeitschrift* and others, upon the tables. The busts of several German chemists of Wöhler, Eilhard Mitscherlich, Heinrich Rose, A. W. von Hofmann and August Kekulé have been placed on top of the cases. The bust of Justus von Liebig is on view in the Liebig Laboratory on the right. On the wall between the two entrances is a view of the Hofmann House in Berlin and a drawing of the Liebig Laboratory in Giessen with portraits of A. W. Hofmann, Will Varrentrapp, Strecker and others.

On the left of the entrance is the **Alchemistic Laboratory** which, under a dark Gothic vaulted roof, contains the mysterious laboratory of the old adepts of the 15th to the 17th century, to whose fantastic experiments, carried out in a secrecy that shunned the eyes of the world, we owe the invention of gun-powder, porcelain, phosphorus, Nordhäuser vitriol oil, beetroot-sugar etc. The apparatus exhibited are partly originals partly copies of old specimens from the Germanic Museum in Nürnberg. The large fragments of ore which are exhibited inside and in front of the smelting-furnace, are from one of the oldest German mines in Freiberg in Saxony.

The **Liebig Laboratory** leads off from the opposite side of the reading-room, and is a faithful copy of Liebig's laboratory for analytical instruction at Giessen. Among the apparatus exhibited, which fill us with amazement by reason of their primitive construction, we must specially call attention to a model of the so-called Liebig cooler, still used for

distillation purposes, and to the Liebig combustion furnace with coal fuelling, which was of great importance in the introduction of elementary analysis. Collections of preparations by Liebig and by his pupils and contemporaries, Wöhler, A. W. von Hofmann, Eilhard Mitscherlich, A. Kekulé and Körner, are also exhibited in four cases.

About 3700 preparations are exhibited in the departments for modern chemistry, the majority of which are wholly German inventions; we pass through the entrance near the Alchemistic Laboratory into the Hall for General and Inorganic Chemistry, and first of all come to a collection of apparatus for gas analysis.

In this room there is also an inorganic double work-table, a specimen of those used in the 1st Chemical University Laboratory in Berlin: apparatus for qualitative and quantitative work and for volumetric analysis are exhibited on this table, and a double digestorium (with draught-cupboard), intended to protect the experimentist from noxious gases or danger from explosion has been set up. In the other vitrines apparatus for the determination of molecular weights are exhibited; in the cases are preparations in connection with scientific and technical Inorganic Chemistry, inorganic pigments, the technical extraction of which has reached a high stage of perfection in Germany; other scientific and technical inorganic preparations and a dark-room for experiments with radio-telluric rays and fluorescent phenomena.

The door on the left of the narrow end of the hall leads into the room for **Analytic Scales and Balances**, the door on the right into the **Pyro-chemistry** exhibit containing electric and other modern furnaces for smelting and welding.

Adjoining this room is the hall for **Electro-chemistry**, which contains various apparatus in six vitrines, besides an electro-chemical laboratory after Nernst in Göttingen; in four other vitrines are preparations acquired by electro-chemical methods, apparatus for quantitative analysis by electrolysis and a modern ozone apparatus for constant current.

The large group Organic Chemistry, the Dye Laboratory, Physiologic Chemistry and Chemistry of Fermentation occupy the opposite side of the exhibiting room.

In the hall for **Organic Chemistry** we find on the far wall towards the Liebig laboratory first of all apparatus for organic elementary analysis exhibited in six vitrines. To these belongs an organic work-table for four experimentists, on which apparatus for preparatory organic work are exhibited. Adjoining these is a double digestorium, a work-table with leaden covering for larger operations, especially for distillations under diminished pressure, and a series of vitrines with dry cases and preparations. A large collection of more than 2500 organic, scientific and technical preparations, which have been supplied by savants and members of the Chemical Manufacturing Industry, is exhibited in 15 cases, having been divided into the following groups: aliphatic and aromatic preparations, technical preparations of the aromatic series, diphenylmethane and triphenylmethane dye-stuffs, azo dye-stuffs, anthrachinone dye-stuffs, acridine, azine and thiazine dye stuffs, indigo, sulphur dye-stuffs, hydroaromatic compounds, terpenes and camphors, technical perfumes, heterocyclic carbon compounds and alkaloids.

The **Dye Laboratory** exhibited (Dr. Lange, Krefeld) is intended to give an idea of the appliances in use in educational establishments, dye-factories, dye-works and printing-establishments, for the qualitative testing and quantitative analysis of dye chemicals and ingredients, for determining the worth of dye-stuffs and mordants, for the discovery of new dye-stuffs, for testing the fastness of colors, etc.

The shaking-apparatus and the appliances for bomb-tube experiments occupy a separate compartment; in the same room autoclaves, blasting furnaces, shaking blasting-furnaces, large vacuum distillation appliances, etc. are exhibited.

The last hall is given up to the exhibit of **Physiological Chemistry** and **Chemistry of Fermentation**. This exhibit comprises medicines, a large variety of different kinds of sera, scientific preparations from the saccharine group, from the Chemistry of Albumens and Yeasts, and from several technical preparations related to them. It also includes a large number of apparatus used for purposes connected with Physiological Chemistry and the Chemistry of Fermentation, and a table for microscope-work after Dr. Lindner. Above the

middle case, which contains the saccharine-preparations, hangs the picture of the master of organic synthesis, Geh. Reg.-Rat Prof. Dr. E. Fischer, Berlin.

The Chemistry Exhibit was prepared by Prof. Dr. C. Harries in Berlin; Dr. Zwingenberger is acting as official representative.

II. Educational Building,

containing the groups Academies of Sciences, Universities and Technical Colleges, Botany and Zoology, Medicine, Scientific Instruments, Lecture-room and Elementary and Advanced Education.

There are two entrances: the main South entrance of the Educational Building, and the North East main entrance; through the latter the visitor comes to the German Educational Exhibit only when he has reached the roofed-in middle court of the building, as may be seen on the back of the ground-plan attached.

The Head Office of the General Commissioner, Graf zu Limburg-Stirum, is just inside the main South entrance on the right of the stair-case leading to the gallery.

Opposite the main entrance we come into the

Court of Honor,

in which is exhibited a bust of the Emperor William II, modelled by Prof. Manzel of Berlin. In repositories on the walls are a collection of writings of the German Academies of Sciences, from the Berlin, Göttingen, Leipsic and Munich Academies. The work "Das Unterrichtswesen im Deutschen Reich", edited by Geh. Reg.-Rat Prof. Lexis of Göttingen with the cooperation of numerous specialists and published in connection with the Educational Exhibit, is laid out on tables in the fore-ground — the German edition in four volumes, the abridged English edition in one volume with the title: "A general view of the history and organisation of Public Education in the German Empire".

Through one of the two exits near the bust of the Emperor we enter the room set apart for the

Excavations.

The most important is the **Saalburg Exhibit**. The Roman citadel Saalburg was part of a system of fortifications which the Romans, after they had subjected the Rhine- and Danube-countries, set up against the Germanic tribes. The Saalburg was one of the larger frontier-citadels, and, 7 km. north of the Homburg v. d. Höhe of today, guarded the most important pass in the Eastern Taunus Range. The numerous interesting discoveries which were made in the ruins of this citadel and the adjoining part of the frontier-wall the *Limes*, led Emperor William II to issue a command for its re-erection after the plans of Geh. Baurat Prof. Jacobi of Homburg; the Praetorium and the greater part of the outer wall with three gates have already been completed.

The exhibit, which has been put together by Landbau-Inspektor Jacobi, comprises models of the citadel on a scale of 1:200, of the Praetorium and the reconstructed Porta sinistra (1:50), of a Roman heating-apparatus (Hypocaustum [1:20]), of a Pfahlgraben tower (1:20) and a draw-well (1:20), moreover ground-plans of the citadel and models of arms and tools, which last scarcely differ from their modern counterparts. There are also rich ornaments in bronze and silver, toilet articles and surgical instruments, writing materials, lighting apparatus and 21 different types of shoes.

The **Excavations at Baalbek**, the ancient Heliopolis, which were begun in 1901 under the direction of Otto Puchstein, are concerned with two temples of Jupiter Heliopolitanus built in the reign of the Antonines. 10 large photographs, taken by Geh. Baurat Meydenbauer for the Königl. Preussische Messbildanstalt in Berlin, with various drawings, give some idea of these wonderful remains of late Roman architecture.

The **Excavations** being carried on amid the ruins of Babylon since March 1899 at the instance of the German Orient Association in co-operation with the General Administration of the Royal Museums, are represented by

copies of five Babylonian flag-stone pictures; the copies having been made by W. Andrae (Dresden) from the originals. Of the **Excavations on the Burial-field of Abusir in Egypt**, a temple consecrated to the Sun-god (built 2500 B. C.), which was investigated by Dr. Borchardt 1901—1904, is represented by a ground-plan and a water-color painting of the whole field of the pyramids. The **Excavations at Miletus and Priene**, which have been proceeding since 1899 under Dr. Th. Wiegand's direction, are represented by 12 photographs of Miletus, taken by the Königl. Messbildanstalt, and by a plan of Priene.

A **Collection of large photographs of Architectural Monuments** from West Germany, likewise taken by the Königl. Messbildanstalt in Berlin, and forming a valuable aid in art-instruction in German Universities, has been added to the Excavation Exhibit.

Universities.

The two exits from the Saalburg exhibition lead into the **room of the Universities**, whose contents chiefly consist of plans and views. In the middle of the room we see the statue of Athena Lemnia imitated in antique bronze, as restored by Furtwängler and Aldenhoven and cast by A. Gerber of Cologne. Then come other busts, among them one of Mommsen modelled by Dr. Walther Lobach of Charlottenburg, and further, busts of Gutenberg, Goethe, Luther, Kant, the brothers von Humboldt, etc. A number of tables contain portfolios with drawings of apparatus and appliances used in the Universities of Berlin, Bonn, Breslau, Göttingen, Halle, Kiel, Königsberg, Marburg, Würzburg, and Leipsic; the new buildings for the Charité Hospital are represented by a water-color painting (bird's-eye view), perspective pictures and a revolving stand with 72 photographs; all these have been sent by the Berlin University. A Triptychon oil-painting by Martini of Berlin represents the New Botanical Gardens near Dahlem. The main building of the University of Bonn is shown in a large photograph. The New Medical Buildings of the University of Breslau are represented in 16 large photographs from the Kgl. Messbildanstalt of Berlin, also those of Marburg

in 8 pictures. Moreover there are photographs of Göttingen, Greifswald, Halle, Königsberg with the Palaestra Albertina and Leipsic, and colored sketches of the Jansen wall-paintings in the Aula of the University of Marburg. There are, besides, other Institutes related to the Universities which are represented by drawings and photos: the Royal Library, the Royal Academy of Sciences, and the University Library of Berlin, the new buildings of which are shown in plans as well as by an oil-painting by Grete Waldau. The Royal Meteorological Observatory near Potsdam (water-color by E. Palm) 10 large photographs of other Scientific Institutes in Potsdam (Astro-physical Observatory and Geodetic Institute) new buildings of the Aeronautical Observatory near Lindenberg, (water-color by E. Palm) and the boat-house of the Academic Rowing Club, Berlin, (water-color by R. Hansche).

Technical Colleges.

The adjoining room contains the **Exhibit of the Technical Colleges** consisting of maps, models, pictures and printed matter arranged according to the direction of Prof. Kammerer of Charlottenburg. "Der Dämon des Dampfes" (The Demon of Steam), a statue by Prof. Reusch of Königsberg, has been set up as an appropriate symbol; a model of the Technical College in Charlottenburg-Berlin, a model of the ocean-liner "Kaiser Wilhelm II", and a model of a sliding-platform or stage worked by electricity, a machine demonstrating the cog-wheel theory and numerous photographs give an idea of the work of the Berliner Technische Hochschule; the Aachen Institute sends graphic statistic tables; the Technische Hochschule in Danzig, which has just been completed, is represented by a large water-color by E. Palm, and the Dresdener Hochschule by a model and ground-plans of the New Buildings for the Mechanical Department erected in 1898—1904. There are also exhibited a Druckschrift der Kgl. Sächsischen Bergakademie zu Freiberg i. S., a collection of photographs and plans and Druckschriften der Städtischen Handelshochschule zu Köln a. Rh. Busts of

Gauss, Helmholtz and Siemens, by A. Gerber, Cologne, are set up among the articles exhibited.

Botany.

The **Biology Rooms** are situated opposite the halls containing the exhibit of the Universities and Technical Colleges, and adjoining the outer wall of the main building; next the bureau of the General Commissioner is the Botanical Exhibit and adjacent to it the Zoological one.

All information may be obtained from Preparator Seifert.

The **Botanical Exhibit** has been prepared by the Royal Botanical Garden and Museum in Berlin according to the directions of Geh. Reg.-Rat Engler; it gives a general idea firstly of the scientific activity of the officials of these two institutes by means of writings on the most important branches of their work, secondly of the new grounds of the Botanical Gardens and Museum in Dahlem, and of the vegetable products of the German Colonies. The works exhibited are partly writings on general systematic botany, partly magazines edited by officials of the Botanical Museum, special systematic works treating of special families, and finally general and special botanical geographical works of individual countries, and works on special branches of botany.

The new site of the Botanical Garden and Museum at Dahlem was begun in the year 1898 after the present garden in Berlin had gradually been so encroached upon by new buildings that it could no longer fulfil its purpose: it will be completed in 1906. Parts of it are devoted to botanical geography; there is a very good imitations of rocky and hilly regions, an arboretum for trees and shrubs cultivated in the climate of North Germany, a systematic department comprising most of the plant families, morphologico-biological groups illustrating the adaptability of plants to various conditions, and the medicinal, poisonous and economic plants, show-houses and conservatories and the buildings of the administration and management. A plan and photographs give an idea of the general appearance of the grounds, garden and museum; an oil-painting by Martini of separate parts of the grounds is hung in the University hall.

The Exhibit of products of the German colonies consists of only a small selection of those which can be more easily transported, and which are of such a nature as to excite special interest. Thus food-plants, aromatic plants, spice, oil and fat plants, color, caoutchouc, tan-stuff and fibrous plants, timbers and various characteristic plants, with views of vegetation-growths and illustrations of special plants from Togo, Cameroon, German S. E. and S. W. Africa and from the German South Sea Possessions are exhibited.

Zoology.

In the **Zoological Department** are exhibited the means and methods employed by the German Biological Museums in their endeavours to impart to students in particular, but also to more general circles, an understanding for the forms, construction and phenomena of living organisms. Only those objects have been exhibited which are especially instructive, by reason of the method of their mounting, preservation, preparation or explanation. As far as possible the animals have been exhibited in their natural surroundings in order to mark more clearly their adaptability to their conditions of life. The exhibits have been sent by the Natural Science Museums in Altona, Bremen, Berlin, Darmstadt, Hamburg, Heligoland and Stuttgart, and from the University Museums in Berlin, Breslau, Leipsic, Heidelberg, Munich, Tübingen and Würzburg, the collection of the Königl. bayerische biologische Versuchsstation für Fischerei in Munich and by several Art Institutes.

The exhibit, which was prepared by Prof. Plate of Berlin and put up by Prof. Ehrenbaum of Heligoland, consists of the following sub-groups: 1. Preparations for use in connection with a scientific system of zoology. 2. Anatomical preparations and models. 3. Preparations and models for use in embryology and the history of development. 4. Pathological and biological preparations. 5. Biological groups and pictures. These last are exhibited on the walls.

Medicine.

The **Medical Exhibit** has been placed in the rooms adjoining the inner wall of the main-building, opposite the halls belonging

to the Universities and Technical Colleges. Its main object is to show the system of medical instruction followed in the German Universities and the apparatus made use of by the teacher in instructing; with this aim in view, articles from all the main departments of medical science have been exhibited. The exhibit was prepared according to the directions of Geh. Med.-Rat Prof. Dr. Waldeyer, with the co-operation of Prof. Kutner, both of Berlin, and arranged by Dr. Kaiserling of Berlin with the assistance of preparator Seifert. Of the numerous departments of medical science five were chosen, namely Bacteriology, Anatomy, Surgery, Pathological Anatomy and Internal Medicine, to which, as a special exhibit a Roentgen Cabinet furnished with all the newest apparatus has been added.

I. The **Department for Bacteriology and Experimental Therapeutics** including the Combating of Epidemics, demonstrates the progress which has been made in this department since the World-Exhibition at Chicago; among the most noteworthy of these advances are the serum therapeutics established by Behring, the modern rational prophylaxis of epidemics due to Koch's labours, and the combating of tropical diseases, especially malaria. Moreover a number of important human and animal germs have been discovered, such as the bacilli of influenza, bubonic plague, dysentery etc.

In order to show the manner in which the results of research are demonstrated to the student, each infectious disease has been treated separately, in accordance with the system in force in the bacteriological courses of instruction. The following diseases and their organisms are represented: tuberculosis, cholera, bubonic plague, leprosy, small-pox, typhus maculosus, abdominal typhus, dysentery, malaria, syphilis, tetanus, meat-poisoning, anthrax, streptococci, staphylococci, pneumococci, meningococci, gonococci, actinomycosis, influenza, sleeping disease, diphtheria, swine erysipelas, swine epidemic and swine plague, rabies, glanders, bacteriology of eye-diseases and various parasites. As far as possible the micro-organism of the infection is shown first, in the form of pure cultures and in micro-photographic enlargements; the injurious effect produced by the corresponding micro-orga-

nism is then shown, partly by means of pathological preparations and partly by illustrations. The diagnosis of bacteria is elucidated partly by the demonstration of their specific forms of growth and special chemical changes, and partly by the method of agglutination. Further on the preventative measures and the specific methods of treating epidemics are also demonstrated, and it is shown how, by legislative regulations, pamphlets and popular instruction efforts are being made to propagate hygienic knowledge among the masses. The part the water-supply plays in cholera, the part played by rats in bubonic plague, by mosquitoes in malaria, etc. is here demonstrated. Further it is shown how the bacteriological expert now takes the place of the military cordon and land quarantines, which delay trade and traffic. He, equipped with his portable laboratory, fights the pestilence in the very spot where it breaks out. Numerous maps and diagrams show the influence of the new methods upon the decrease in disease and mortality. In the special department for immunity and serum therapeutics, the visitor learns to recognise the more intimate qualities of the blood-serum of immunised men and animals, as well as the anti-toxic and bactericidic sera and the agglutinant stuffs, whose operation is demonstrated in a great number of experiments, whilst Ehrlich's receptor theory (*Seitenketten-theorie*), which is an attempt to throw light upon the origin and operation of these substances, is explained by means of wall-maps. Further, the state supervision of sera, as carried out at the Institute for Experimental Therapeutics in Frankfort a. M., is represented. Adjoining this exhibit is a collection of specimens of all the prophylactic and remedial sera produced in Germany, of the bacterial preparations for purposes of vaccination and a model bacteriological laboratory furnished and arranged by the firm Lautenschläger, Berlin.

The bacteriological exhibit was arranged by the Kgl. Preussisches Unterrichtsministerium by Prof. Wassermann with the co-operation of the Kaiserliches Gesundheitsamt, Berlin.

II. The **Anatomical Exhibit**, prepared by Geh. Med.-Rat Prof. Dr. Waldeyer, Berlin, falls into two parts. The object of the first is to illustrate, by means of methodically arranged

and co-ordinated preparations, the course of the exercises in preparing and dissecting as pursued in the German Anatomical Institutes. For this purpose the following preparations have been exhibited:

1. an arm to illustrate a muscle, ligament and bone preparation, 2. a heart with pericardium to illustrate an intestinal preparation, 3. a brain, 4. an eye, 5. an ear, the last three to illustrate the dissection of the central nervous system and the organs of sense, 6. a foot with injected arteries to illustrate the preparation of the peripheral blood-vessels and nerves.

In the second department are exhibited a number of teaching-apparatus in models, illustrations of all kinds, books, instruments, etc., as well as appliances in use in various institutes; also various demonstrating apparatus which appear specially adapted to purposes of instruction. These objects have been sent from the Anatomical Institutes of Berlin, Breslau, Erlangen, Freiburg, Göttingen, Halle, Heidelberg, Jena, Königsberg, Leipsic, Munich, Strassburg and Würzburg. Some of these exhibits have been placed in the rooms set apart for Teaching-Apparatus.

III. The **Surgical Department** consists of two separate exhibits, organised by the Kgl. Chirurgische Klinik Berlin (Wirkl. Geh. Rat, Prof. Dr. E. von Bergmann) and the Kgl. chirurgische Klinik Breslau (Geh. Med.-Rat Prof. Dr. J. von Mikulicz-Radecki) respectively.

The **first department** comprises the newest projection methods, photographs, plastic reproduction methods (Moulagen), photographs and stereoscopes and the microscopic preparations and diapositives of photographs with Roentgen rays which are intended for projection purposes. Where possible a photograph of the diseased part of the body has been represented, then the Roentgen photograph of this, the method of operation, the preparation obtained through the operation, microscopic sections through the same, and the results of the operation itself. A new experiment is that of a plastic representation by means of models (Moulagen) of the separate stages of an operation. An illuminating apparatus shows series of the Roentgen pictures with remarkable clearness; of these the injection preparations of the bones are worthy

of special mention, likewise an eye-mirror after Thorner, a mirror apparatus by G. Meyer and a cystoscope after Kutner which enables the students at the same time as the instructor to inspect the back-ground of the eye or the interior of the larynx or bladder.

The **second department** of the **Surgical Exhibit** deals mainly with the employment of Roentgen photography and of models (Moulagen) taken from the living body which are best adapted to initiate students into the details of the differential diagnosis of related diseases, and also enable the various stages in the course of one and the same case of disease to be demonstrated. Besides the demonstration of the original plates, the practice of employing reduced diapositives of Roentgograms, in which the details are defined more clearly, has proved most useful.

The knee-joint was chosen as an example and has been exhibited in eleven different diseases. The technique of the methods of operation on the stomach and intestines practised in the Breslau Surgical Clinic is illustrated by five large models (Moulagen); there is a most exhaustive list of exhibits from the Breslauer Klinik representing the present-day technique of the diagnosis and therapeutics of esophagus diseases; Dr. Kümmell of Eppendorf, Hamburg, shows what surgery has accomplished in regard to the diagnosis and therapeutics of kidney-diseases. Of more general interest is the collection of apparatus for the generation of artificial hyperaemia by Bier of Bonn; the diagnostics of skin-diseases is represented by a series of models from Neisser's Klinik in Breslau. Wall-maps with schematic pictures are exhibited by Garré (Königsberg), Helferich (Kiel), and Trendelenburg (Leipsic). Georg Haertel has exhibited a case of surgical instruments.

IV. Pathological Anatomy. In this department, got up by Geh. Med.-Rat Prof. Dr. Orth with the co-operation of Dr. Kaiserling, Berlin, a number of aids to instruction in special branches are exhibited, namely in Ophthalmology, Rhinolaryngology and Dermatology, in order to show how, even in these branches, instruction is imparted on a morphological basis; this is owing chiefly to the labours of Rudolf

Virchow. Of the articles exhibited the following deserve special attention: representation of the method of dissection in the Berlin Pathological Institute, illustration of the system of the microscopical courses for students, methods employed in the demonstration course of Pathological Anatomy, flash-light photo of a theoretical lecture in the lecture-hall of the new Pathological Museum in Berlin, preparations from the collection of that institute and photographs.

Maps, stereoscopic photographs and preparations for the epidiascope have been exhibited by the Pathological Institutes of Breslau, Kiel and Munich; from the Berlin clinics and hospitals preparations and representations of diseases of the throat, nose, eye, skin, stomach, bones etc. have been exhibited, as well as chromoplastic models (Dr. Berliner, Berlin) of preparations from all departments of Pathology.

V. The **Department for Internal Medicine**, arranged by Geh. Med.-Rat Prof. Dr. Kraus, Berlin, endeavours to show by one selected example, tuberculosis, the principles according to which clinical lectures on internal diseases are given. To attain this object the groups pathology of tuberculosis, bacteriological diagnostics, diagnosis through the medium of the laboratory, clinical diagnosis, special therapeutics, general therapeutics and prophylaxis of tuberculosis are represented.

VI. The **Exhibit of Radiography and of Roentgen Apparatus**, prepared by Dr. Bockenheimer, Berlin, has been placed in a special **Roentgen cabinet**, which, as the plan shows, is situated near where the exit of the large middle passage leads from the main-building to the light-court of the Education Buildings. In it we see, first, several collections of Roentgen photographs taken for research purposes with the Roentgen rays by the Kgl. Preussisches Institut, Berlin, (Director Prof. Dr. Grunmach) and by Dr. Albers-Schönberg of Hamburg; the latter photographs were taken with the aid of the compression-diaphragm, a contrivance which represents a great improvement in the method of Roentgen ray photography. Siemens & Halske, Berlin, exhibit a completely equipped modern Roentgen Cabinet, consisting of: Roent-

gen tubes, spark-inductors, among which are some with sparking-distances of 1 m., various interrupters and auxiliary apparatus such as fluorescent diaphragms, diaphragm-apparatus, the above-mentioned compression diaphragm of Dr. Albers-Schönberg, a heart-measuring apparatus, switch-board and switch-table and measuring instruments, as well as mirror and prism stereoscopes after Dr. Walter, constructed by Krüss, Hamburg.

Siemens & Halske also exhibit apparatus for cautery, endoscopy, galvanisation, electrolysis, faradisation, and finally iron arc-lamps for light therapeutics.

VII. A Collection of selected Medical Teaching-apparatus had to be exhibited in a small hall opposite the Roentgen cabinet, owing to insufficient space. Among this collection special mention must be made of the projection-apparatus with appliances for micro-photography, a number of microscopes from the firm Carl Zeiss, Jena, suitable for a most varied range of work, preparations from various institutes and laboratories, the first remedies physiologically tested in the Pharmakologisches Institut der Universität Berlin (Prof. Dr. O. Liebreich), plans and designs of clinics, diapositives of photographs of the eye, demonstrating apparatus of the movements of the velum palatinum in speaking (Dr. Gutzmann, Berlin), and a number of models (Moulagen) in plaster of Paris and wax by Kolbow, Berlin. Among other exhibits are a case of surgical instruments and electro-medical apparatus by L. and H. Loewenstein, Berlin, cinematographic projection apparatus by Messter, Berlin, and models of eye-diseases by F. Ad. Müller Söhne of Wiesbaden.

All information may be obtained from Preparator Seifert.

Lecture Hall.

The **Lecture-Hall** erected at the expense of the Imperial Government, is situated in the very middle of that part of the German Educational Exhibit which occupies the Educational Building. It may be reached by a passage through the medical exhibit (Surgery I) and by the main-passage which leads past the Roentgen cabinet (see plan) to the Exhibit of Scientific Instruments. Its object is to represent a small-sized

auditorium furnished with all the more important appliances for instruction and experiments, such as is in general use in scientific institutes in Germany. This hall is, however, also intended to serve the special purpose of a hall for lectures, demonstrations and experiments from all departments of the German Exhibition.

It contains modern auditorium fittings by Max Kohl, Chemnitz, contrivances for darkening the hall, an experiment-table, a black-board frame, a projection-screen with electro-motor appliances, a switch-board, and a water air-pump with bellows. The projection-apparatus for natural-color photography of Prof. Miethe, Berlin with series of pictures, and a large epidiascopic apparatus by C. Zeiss, Jena, have also been set up for demonstration purposes. The lecture-hall subsellia have been sent by the firm P. Joh. Müller & Co., Berlin.

Scientific Instruments.

The **Exhibit of Scientific Instruments** is in that part of the roofed-in inner-court of the Educational Building which adjoins the main-building, near the lecture-hall; it is arranged in four halls and one vestibule. This exhibit can be entered only by way of the middle-passage, opposite the Elementary and Advanced Education Exhibit.

In the vestibule, which adjoins the bureau of the official representative, where application for guidance through the exhibits has to be made, several cases with demonstrating apparatus for instruction in higher educational establishments are exhibited, sent by the firms Hartmann & Braun, Kohl, Leppin & Masche.

Through the door on the right the visitor enters the hall devoted to **Optics** (B in the plan). In this hall photometric apparatus have been exhibited by the firms Schmidt & Haensch of Berlin and Krüss of Hamburg, optical glasses by the Jenaer Glaswerk Schott u. Gen., among which must be mentioned objectivs up to 1 m in size, prisms, and the new glasses transparent to ultra-violet light. An optical bench constructed by Toepfer & Son according to the directions of Prof. Hartmann (Potsdam) serves for the convenient investigation of objectives. The Zeiss'sche Werk-

stätte in Jena exhibits instruments for optical measurements and stereoscopic instruments of the newest construction: prism and relief telescopes, with very pronounced stereoscopic power, and a stereoscopic distance measuring apparatus. By means of the interference spectroscope constructed by Schmidt & Haensch after Lummer & Gehrcke the finest details of spectral lines may be analysed; polarisation apparatus, in which the Lippich half-prism polariser is used, are exhibited by Peters as well as by Schmidt & Haensch. In the department of microscopy, numerous instruments for the most varied purposes are exhibited by the firms Brunnée, Fuess, Leitz, Toepfer, and Zeiss, with preparations, among which is Moeller's unique collection of diatomacea. The apparatus for rendering visible ultra-microscopic particles, designed by Siedentopf and Zsigmondy and constructed by Zeiss, will arouse special interest. Spectral apparatus (among them a precision spectrometer by Wanschaff), instruments for optical measurement, preparations of lime-spar, are exhibited by various firms; Hauswaldt of Magdeburg exhibits his beautiful photographs and his atlas of the interference figures of crystals in polarised light. Some of the "black bodies" used for the investigation of radiation are also exhibited, as well as a spectro-photometer constructed by Schmidt & Haensch after Lummer and Brodhun, together with a rotary dissector and some smaller projection apparatus by Schmidt & Haensch.

The adjoining hall (A of the plan) contains the instruments for **Astronomy and Geodesy, Scales and Balances, and Apparatus for Length Measurement.** The double refractor of the Kgl. Astrophysikalisches Observatorium, the objectives of which have a diameter of 80 and 50 cm, and which was made according to the designs of H. C. Vogel, A. Repsold and Söhne, C. A. Steinheil Söhne in Munich and Schott und Gen. in Jena, is represented in a large photograph. A photograph of Orion's Nebula taken by Hartmann with this instrument gives a good idea of its capabilities. Toepfer & Sohn have exhibited a wedge photometer for the observation of the brighter stars, which has been mounted in the manner of an équatorial coudé according to the suggestion of Müller

and Kempf. The same establishment shows a microphotometer according to Hartmann for the measurement of the surface luminosity of very small light emitting surfaces, which has also been found useful in the investigation of the sensitiveness of photographic plates. In the field of astrometry a meridian circle is exhibited by Bamberg and a transit instrument by the same maker, furnished as is the meridian circle with a Repsold registering micrometer for diminishing the error of the personal equation of the observer. A collection of instruments for accurate astro-geodetic measurements is exhibited by the firms Bamberg, Tesdorpf and Wanschaff, and a numerous selection of geodetic instruments by Rosenberg and Tesdorpf. Among these belongs the zenith camera after Schnauder, which makes use of photography for the determination of time and longitude, and which enables accurate results to be obtained by travellers even when unskilled observers.

A new system of measurement which is made use of in the Pulfrich stereo-comparator, made by Zeiss, promises to be of great importance especially for geodesy and astronomy. In this the stereoscopic observation and measurement method is used to determine the distribution in space of distant objects, to measure their size or to compare their differences (for example, star photographs of the same portion of the heavens, taken at different times). The stereo-comparator has already been used in geodesy and astronomy with the greatest success, e. g. in photogrammetric topography.

Of the geophysical instruments exhibited, attention is specially directed to the v. Sterneck pendulum apparatus, improved by Helmert, with invariable pendulums for the relative determination of gravity, which is exhibited by Fechner its maker. Of newer seismologic apparatus, the Ehlert horizontal pendulum, constructed by Bosch of Strassburg, has been exhibited, as well as a model of the same after Hecker. The Wiechert astatic pendulum seismometer, a new instrument of extraordinary sensitiveness, has been exhibited by Bartels of Göttingen; the earth-movements registered are magnified 200 times. Exhibited is a curve of an earthquake in Asia Minor, registered by the instrument in Göttingen.

Of nautical instruments two apparatus have been exhibited, both of new construction: the deep-sea tidal gauge by Mensing and the compass-reading transmission by Siemens & Halske.

Balances have been exhibited by several firms — Bekel, Brunnée, Bunge, Hasemann, Schopper, Spoerhase, Stückrath and others; the most interesting instrument among these is the standard balance for weights up to 20 kg (Stadt-hagen), exhibited by the Kaiserliche Normal-Eichungskommission, of Charlottenburg. This instrument, made by Stückrath, enables weights up to 20 kg to be weighed with an accuracy of 1 mg (that is with an accuracy of $\frac{1}{20\,000\,000}$).

The large new comparator of this institution (Weinstein and Köster) constructed by Heele, is shown in photographs. An apparatus for the determination of thickness, a cathetometer by Heele, a dividing engine by Sommer & Runge and the model of a Riefler standard clock with nickel-steel pendulum are also shown. The original of this last can be seen in the Exhibit of the Washington Naval Observatory. Several collections of drawing instruments (Riefler, Schönnner) must also be mentioned, instruments for accurate measurement in shop-work by Bieling and Hommel, a calculating machine by Burkhardt with photographs of the older calculating machines of Leibniz and Hahn from the 17th and 18th centuries. We must not neglect to mention the extremely interesting photographs of the heavens, by Max Wolf of Heidelberg.

Passing back through the hall for optical instruments and the entrance-room, the visitor comes to the **Exhibit of Electrical Apparatus** (C in the plan). It comprises the equipment of physical and electro-technical laboratories with electric measuring instruments, purely technical apparatus being excluded. The apparatus for measurement are grouped in several vitrines.

Of the instruments for direct current measurement, we must before all refer to the manganine standard resistances constructed chiefly by O. Wolff, invented by Feussner and Lindeck, to the models of the Feussner Compensations Apparatus, in which the Weston cadmium element is used, and to the instruments of the Deprez-d'Arsonval

type for the direct reading of current, voltage, etc., exhibited by Siemens & Halske and Hartmann & Braun.

The more delicate laboratory apparatus are exhibited in cases and vitrines whilst the instruments of technical importance are arranged on two switch-boards. The mirror-instruments, partly ready for use, are arranged on two wall-brackets. Among these special attention is called to the galvanometer protected against disturbances from neighboring heavy currents, e. g. electric railways (shield-galvanometers by du Bois and Rubens, moving coil galvanometers, after Deprez d'Arsonval).

Siemens & Halske, Hartmann & Braun have constructed apparatus for the direct measurement of alternating currents based on the dynamometric principle; with these apparatus the highest voltages may be measured without danger, transformers and excellent porcelain insulators being employed. To these belong also the Ferraris rotating field instruments, exhibited by Siemens & Halske. For testing current meters for alternating currents, the Holborn-Kurlbaum pyrometer is employed, at the suggestion of Orlich. We have still to mention an oscillograph exhibited by Siemens & Halske, similar to the Blondel apparatus, and the instruments for measuring the frequency with vibrating tuned reeds, exhibited by Hartmann & Braun.

Exhibited are several apparatus for the measurement of self-induction, constructed by the Reichsanstalt (Orlich) and the firm Siemens & Halske on the basis of Wien's fundamental researches; of these the new self-induction coils for the Pupin system are of especial interest.

The Reichsanstalt also exhibits a rotary interrupter after Maxwell-Thompson, for the measurement of capacities.

For the magnetic investigation of iron with direct current, du Bois' magnetic balance and the apparatus of Köpsel and Bruger are used; the apparatus of Richter and Möllinger for the testing of iron according to the wattmetric method are also exhibited. Improved apparatus for the measurement of electrolytic resistance and for the determination of the conductivity of liquids after F. Kohlrausch are exhibited by Hartmann & Braun.

The fourth hall (D in the plan) contains **Thermometric and Meteorologic Instruments**, as well as **Scientific Glass Apparatus**. The liquids thermometers filled with pentane (Rothe) for measuring very low temperatures, were worked out in the Reichsanstalt and are exhibited by Burger, Richter and Siebert & Kühn. Of the mercury thermometers, a large number of which are exhibited by Fuess, Götze, Greiner, Niehls and Schultze, we must refer to the so-called "high reading thermometers" (up to about $+ 570^{\circ}$ C.), in which the mercury column is under high pressure, and further to the quartz thermometers (upto about 750° C.) exhibited by Siebert & Kühn. For still higher temperatures the Le Chatelier thermoelement is in general use owing to the researches of Holborn, Wien, Day, Lindeck and Rothe. This thermoelement, consisting of a combination of pure platinum and a 10% platinum-rhodium alloy, suitable for temperatures from $+ 300^{\circ}$ to $+ 1600^{\circ}$ C., was produced in the Platinschmelze of Heraeus, Hanau. Electrical furnaces, and the electrical measuring apparatus used with the thermo-elements are exhibited by Hartmann and Braun, and Siemens & Halske. Resistance thermometers are represented by two platinum thermometers after Jaeger and v. Steinwehr exhibited by the Reichsanstalt, and by apparatus by Hartmann & Braun.

Scientific glass apparatus, such as areometers, chemical graduates, etc., which have been brought to perfection specially through the work of the Normal-Eichungskommission, are exhibited by Greiner & Schultze. Various vacuum tubes are also exhibited (Roentgen tubes, etc.) and vacuum vessels for storing liquid air, by Burger, Gundelach, and Müller-Uri. Special attention is called to a number of Gundelach vacuum-tubes, which are to be seen in action, showing beautiful fluorescence phenomena on the enclosed minerals, excited by cathode or Roentgen rays. Very interesting are the quartz vessels exhibited by Siebert & Kühn and Heraeus.

Special smaller groups consist of the apparatus for calorimetry by the firms Peters and Junkers & Co., the apparatus for the measurement of high pressures, by Stückrath, Schäffer & Budenberg, an apparatus for

testing indicators (Dreyer, Rosenkranz & Droop) and lastly a photographic registering furnace-gas-analyser by Schultze.

Of the meteorological apparatus we must first mention those used nowadays in Germany in scientific aeronautics e. g. — kites, Assmann rubber balloons, kite-balloons and the instruments used in connection with them for registering meteorological phenomena (Assmann, Hergesell); these latter are chiefly exhibited by the Aero-nautisches Observatorium des Kgl. Preussischen Meteorologischen Instituts in Berlin, with the co-operation of the firms Bosch, Continental Caoutchouc- und Gutta-percha-Compagnie, Velten & Guilleaume, Fuess, Riedinger and Rosenberg. The results attained with these apparatus are demonstrated by 12 large curve maps which represent the temperature above Berlin as registered by means of daily ascensions during a period of twelve months, and in the second place by several publications, among them the three-volume report on the Berlin Balloon Ascents by Assmann and Berson.

The newer apparatus for the study of atmospheric electricity, on the basis of Elster & Geitel's researches, are employed in an aspiration apparatus for measuring the electrical conductivity of the atmosphere designed by Ebert and constructed by Günther. The measurement is made by determining the number of free ions contained in the air, the observations being made in balloons or on mountain peaks. A proposed improvement on this instrument by Gerdien, is shown in a photograph.

Of the terrestrial magnetic instruments exhibited we must mention the registering variometers designed by Eschenhagen and constructed by Toepfer, a standard magnetic theodolite of the Magnetisches Observatorium, Potsdam, exhibited by Bamberg, an inclinatorium by Tesdorpf, and a small variometer designed by Ebert for magnetic orientation during balloon ascents.

Among the latest meteorological apparatus the Sprung photogrammetric "Wolkenautomat" and a registering constant volume air thermometer after Sprung are shown in photographs. An apparatus for

registering precipitation and evaporation, made on the principle of the Sprung sliding-weight-balance, is exhibited, as well as a wind-gauge after Sprung for remote stations, which registers the velocity and direction of the wind for a full year, and a Hellmann registering rain-gauge. All the apparatus are from the Fuess Werkstätte, including a sea-barometer improved by Hecker, intended to establish a symmetrical movement of the mercury on ships that are being tossed by the sea.

The walls of the hall for "Scientific Instruments" are decorated with large photographs of the Kgl. Messbildanstalt, the Potsdam Scientific Institutes on the Telegraph Hill, a large water-color of the Physikalisch-Technische Reichsanstalt, illustrations of apparatus and interiors, etc. A revolving stand with 64 photographs of various institutes in Berlin, Potsdam and Göttingen completes the picture presented of the present state of fine mechanics and optics in Germany, as regards the aims and interests of science and education.

The exhibit has been arranged according to the directions of Prof. Dr. Lindeck, Charlottenburg, Dr. Krüss of Hamburg is acting as official representative.

Elementary and Advanced Education.

The Elementary and Advanced Education Exhibit is opposite the exhibit of Scientific Instruments, between the Lecture-hall and the room for medical instructional apparatus on the one hand, and on the other the large middle passage and the main passage leading from the N. E. main entrance into the roofed-in light-court (see plan).

If the visitor follows the wide middle passage leading from the south main entrance transversely through the main building into the light-court, the **German School Exhibit** will be found exactly opposite the English Educational Exhibit and next the **Exhibit for Drawing and Artistic Wall Decoration** by Prof. Dr. Pallat, Berlin. Attention is attracted by the models from the Albrecht-Dürerhaus, Berlin, which are arranged on two long tables covered with vitrines. The outer-wall of this room is decorated on the right and left with reliefs by Stadtbaurat Hoffmann (Berlin), which represent groups of German school-boys

and school-girls, whilst the inner walls are adorned with coloured lithographs (originals from the Verlagsanstalten von B. G. Teubner, R. Voigtländer, Breitkopf & Härtel (Leipsic) and with photogravures from the Gesellschaft zur Verbreitung klassischer Kunst (Berlin), with photographs showing German pupils during drawing-instruction, and finally with models of the old masters (sculpture), (plaster of Paris casts in the original colors from the Kunstanstalt Gerber, Cologne). In this room hang two school-boards for drawing-instruction (Exhibitors: Hausmann & Latwesen, Cassel), on which one can work with charcoal, chalk and water-colors. Johannes Müller (Berlin SW) has exhibited in this room a so-called "Zeichenblock" with comfortable seat, moveable drawing-board and model-stand. The firm Günther Wagner has exhibited boxes of watercolors and indelible drawing-inks; finally we must refer to Sanders Präparatorium (Cologne) where the artistic animal models of the Albrecht-Dürerhaus were produced.

In this Drawing Exhibit prepared by Prof. Dr. Pallat, Berlin, are six large desks along the back and side-walls, and on these are 12 folios of drawings by scholars, which represent the course of instruction in the various kinds of schools. Inside these desks are 34 portfolios with drawings by scholars of various institutions. In each portfolio are the works of three or more scholars of different degrees of proficiency, done in the last semester or in the last school-year.

Further on in the same direction, on the outer-wall of the exhibit, which is decorated with „putti“ and German eagles, we see further specimens of artistic wall-decoration and illustrations of Stuttgart and Munich school buildings. The **Main Entrance** to the **School Exhibit**, the faithful copy of an existing German school portal (work of Stadtbaurat Hoffmann, Berlin), is right in the middle of the light-court where the Educational Exhibits of England, France, and of the Harvard University meet. In the middle of the first room the statue of a female figure by the Berlin sculptor Prof. Manzel has been set up as Symbol of Education. The pedestal, which is surrounded with flowers, is decorated with carved festoons after sketches by Stadtbaurat Hoffmann. The designs of the Berlin school-buildings and facades

of Berlin teachers' residences, exhibited in the same room, are also his work. A small side-room to the left is occupied by the Munich school-exhibit. Here are shown the woodmodel of a Munich primary school, photographs of city public-school buildings in two revolving stands, ground-plans and photographs of further school-buildings in the capital of Bavaria, a plan of the distribution of the school-houses and scholars' play-grounds in Munich, and illustrations of the primary and continuation school system in that town. On the right hangs a large picture of the Städtische Kunstgewerbe- und Handwerkschule zu Charlottenburg, and beneath it an interesting woodmodel is exhibited, which represents a combination of the gymnasium (ground floor) with the public library and reading-room (in the upper storey) with the adjoining rooms for book-binding, giving out books, etc. Around the walls hang ground-plans, sketches, plans and photographs of school-buildings in Breslau and Darmstadt, pictures representing school-life in Leipsic, Chemnitz, etc.; at the instance of the Breslau municipality graphic representations and printed matter on the revival of educational life in Breslau have been exhibited on a special table.

Directly behind the allegorical figure, in the room in the middle of which drawings by scholars of the Leipsic schools have been exhibited on a revolving stand, upon the tables to the right and left lie the specimens of the boys' hand-work from schools in Saxony, Strassburg and Hildesheim, and teaching-apparatus used in instruction in handwork for girls (especially in Strassburg schools), and finally the literature regarding instruction in hand-work manual dexterity, instruction in trades and mechanics, drawing and writing copies and normal courses of instruction, especially the handwork courses illustrated with models, by Max Ruess of Ulm. On the walls hang plans, drawings, graphic representations and photographs illustrating the work of the town-councils at Dresden, Leipsic, Hildesheim, Strassburg, Elberfeld, Barmen and Düsseldorf in the interests of public instruction and general education.

In the passage between this last room and the first-mentioned, photographs along both walls represent the work in the Berlin Handwork-Schools and Municipal Technical School. Above and below them hang statistic tables showing the development of the Berlin system of Continuation, People's and Technical Training Schools.

In the next room on the right, containing a bust of Herbart, more pictures and statistic tables are exhibited: pictures of new school buildings in Berlin and more school work from Berlin, Hannover and Leipsic, shown in portfolios and albums. The most important German works on pedagogy recently published have been exhibited, and are arranged around the bust of Herbart. In a small separate room in the middle of the whole department is the special exhibit of the Kreuznach Realschule, consisting of pictures, statistical tables, plans, photographs, printed matter and school exercise-books, which give an insight into the work and organisation of this institution besides showing its exterior and interior arrangement. Similar exhibits from those schools which represent the various kinds of higher instruction for boys are on view in the next three rooms on the right. In the room on the right with two large wall-pictures from Godesberg the peculiar character of the Evangelical Pedagogium at Godesberg (a Private Institution on the Rhine), is represented. The scholars of this establishment are brought up in the homes of the teachers in the various villas lying around the main-building. On the small revolving-stand are views of daily life in the Godesberg institution; on the larger revolving-stand are photographs, statistical diagrams and summaries and time-tables of the second Berlin Realschule. The time-table of these six-class, non-Latin Berlin schools varies-, as is well known, from the time-table prescribed by the State. They were founded by the former Stadtschulrat Bertram (Berlin), a portrait of whom adorns the back-wall of this room. Finally the Bochum Ober-Realschule and some German schools in foreign lands, have also exhibited in this room. The time-tables of these last vary little from those of the Realschule. Two or three pictures here exhibited illustrate work in the Teachers' Seminaries for Training

Candidates for teacherships in higher schools — these Seminaries are connected with our advanced schools. In the next room containing the bust of Ernst Moritz Arndt, is the exhibition from schools with the Realgymnasium time-table; to these belong also our Cadet Schools. The Realgymnasium at Elberfeld shows the normal, that at Barmen the reform time-table. In the last compartment on the right are all the objects exhibited by the Grammar Schools at Wongrowitz and Posen, by the great Boarding-schools: Joachimsthal Gymnasium and Pforta, and by the two Frankfurt Reform Schools: the Goethe-Gymnasium and the "Model School" ("Musterschule").

If we now cross to the opposite room, past the bust of Homer, we come to the Exhibit of the Königlische Blindenanstalt at Steglitz, near Berlin, and the separate exhibit of Director Kunz of Illzach i. E. consisting of the teaching apparatus used in instructing the blind, a number of pieces of work by blind pupils of both sexes, some of their games, the school-building and Home for the Blind at Steglitz, and a large number of photographs illustrative of the daily work of the indigent blind in such institutions. In a large room opposite the exhibit of the Realgymnasium at Barmen are the exhibits of the Institutions for the Education of Deaf-Mutes at Frankfurt a. M. and Munich, of the Auxiliary Schools at Leipsic, Kassel and Stolp i. P. and of the Municipal-Idiot Asylum (Berlin-Dalldorf). Teaching apparatus and specimens of the work of the pupils show how and with what results work is carried on in the Schools for the weak-minded. Education Inspector Piper of Dalldorf shows in a collection of interesting plaster-casts abnormalities in the formation of the jaw in weak-minded children.

The next room contains the exhibits of the Village School at Datum-Nienhöfen in Schleswig-Holstein, of the Royal Teacher's Seminary at Ziegenhals, of the 213th Berlin Elementary School for Girls, the 232nd Berlin Elementary School for Boys, of the Arndt Intermediate School (for boys) and of the first Intermediate School for Girls at Stettin. With all the exhibits there is a selection of school-books, school exercise-books, girls' hand-

work and printed-matter giving information on the management of and the results attained in the different institutions.

The following room, in which hangs a picture of Queen Louise (side-wall), contains the exhibits of the Königin Auguste School (High-school for girls) and the Seminary for Women Teachers connected with it, of the Sophien School, Hannover, a High-school for Girls with courses in classics for the older girls, and of the Royal Seminary for Women Teachers at Burgsteinfurt i. W. The firm F. L. Wachsmuth, of Leipsic, has exhibited several pictures for object-lesson instruction in this room.

Returning from here to the Manzel statue mentioned above, we pass through the room containing specimens of instruction in hand-work to the department in which special teaching apparatus are exhibited. The first compartment of this section contains maps, atlases, reliefs, globes, telluria, planetaria, pictures for object-lesson instruction, and text-books for geographical instruction.

In the next room, in which there is a bust of Melanchthon, the maps, pictures and books for our German Religious Instruction are exhibited, as well as music manuscript and books for Singing Instruction. A special teaching-model (Gusinde's "Singing Machine") is also used in singing instruction. On the middle table is an exhibit of Fröbel's Instructive Occupations for the Kindergarten (exhibited by S. F. Fischer, Oberseiffenbach, Erzgebirge).

The object-lesson pictures, maps and books of the adjoining room are mainly for instruction in the classical languages and in history, whilst the next room contains further object-lesson pictures from various German publishing firms, teaching-apparatus by Ebbecke in Lissa i. P., calculating machines, models of school-furniture, model of a German school-room, and finally the exhibit of Dr. Krantz's Rheinisches Mineralien Contor in Bonn. The Winckelmann Lehrmittelanstalt, Berlin, and the Kagerah'sche Verlag technologischer Lehrmittel, Hamburg, have also exhibited here. Schroeder's technico-chemical wall-maps from Th. Fischer & Co.'s Verlag have been hung in the corridor, on the right.

In the middle of the next room, in three glass cases, are exhibited the physical apparatus of a Berlin Elementary School (exhibited by Leppin & Masche), a collection of blossom-models by the firm Brendel (Grunewald), the zoological models by the firm A. Boettcher, Berlin, and other physical apparatus by Gebhard Söhne (Berlin) and by Ephraim Greiner (Stützerbach, Thüringen). The rest of the space is filled up with text-books and object-lesson pictures for instruction in Natural Science, Botany and Zoology. The next compartment is chiefly devoted to teaching-apparatus for Zoology and Anatomy (especially as regards a thorough understanding of the human body), whilst the middle table is covered with preparations and collections by Haferlandt, Pippow, Professor Landois and others.

The nature of the exhibit in the next room is at once indicated by a bust of Jahn, the "Father of Gymnastics", and a model of the Guts Muths monument in Quedlinburg, by Prof. Anders. On the walls hang plans and pictures of the public play-grounds and grounds for gymnastics, photographs representing German school-children at games and sport, in the gymnastic grounds, in the gymnastic hall, on excursions, rowing and swimming. In the middle of the room a large model by A. Buczilowsky of a gymnastic hall (Gymnastic Hall of the Steglitz Elementary School), and a relief by Stadtbaurat Hoffmann (Berlin) representing bears at gymnastics. The technical literature on gymnastic instruction, school sport, games and school hygiene is here exhibited. In the corridor lying between the Exhibition of Teaching Apparatus and the Exhibit of Scientific Instruments we see models of gymnastic apparatus (from Oswald Faber's Fabrik in Leipsic), a model of a boat by Lürssen (Aumund near Bremen), maps from our best cartographic establishments, a further selection of our school-books and literature for the young and a large collection of statistical diagrams from the Königlich Statistisches Bureau, Berlin, tables and summaries, containing material important in the compiling of school-statistics and in studying our system of elementary, intermediate and advanced education.

The papers and pamphlets on view, which bring such material together in handy form, are freely at the disposal of those interested.

If we leave the room containing the German School-Exhibition towards the side where the University of Missouri and the Columbia University of New York have their exhibits, we see on the outer walls of our department, opposite the Columbia Exhibit, on the one hand school-maps of the German Empire and its capital, on which are marked all the High-schools, High-schools for Girls, Agricultural Schools, Cadet Schools, Training Seminaries for Male and for Female Teachers, and on the other hand a large collection of Teubner pictures for the artistic decoration of the walls of the school and home. In this collection two expressive portraits of Goethe and Schiller have, of course, not been forgotten.

Prospectuses, catalogues, and any further information desired may be obtained on application at the Bureau from the Commissary of the German School Exhibition. Professor Dr. Bahlse.

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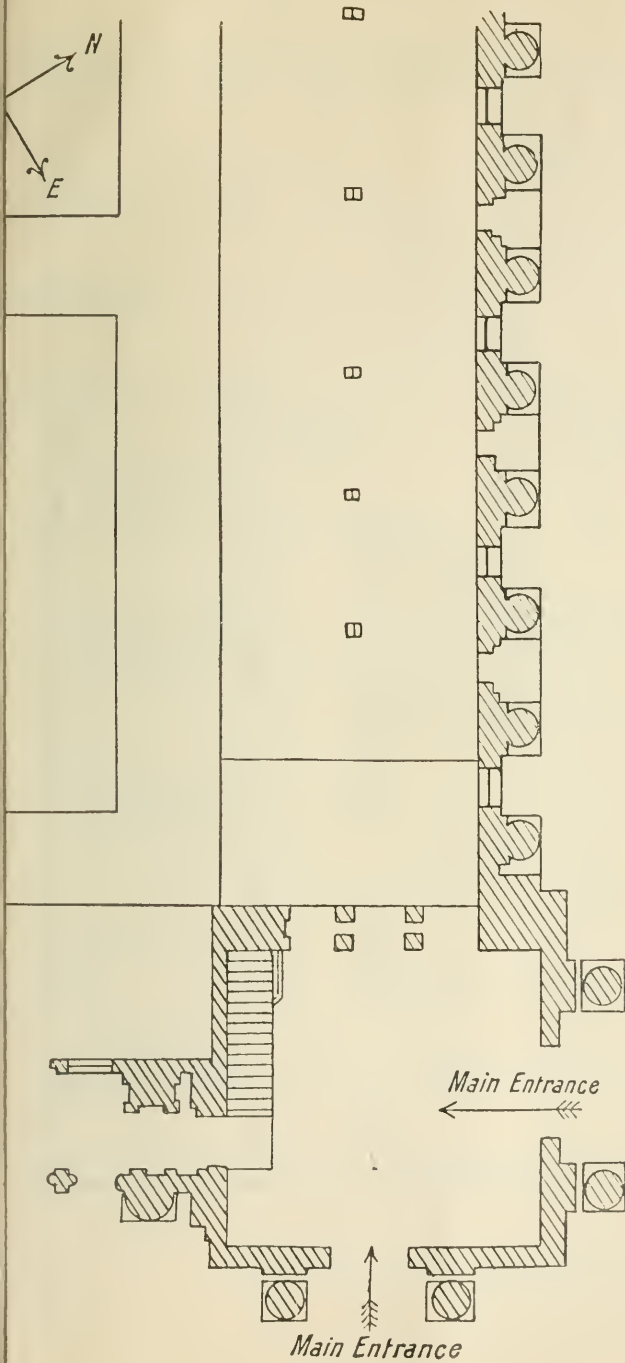
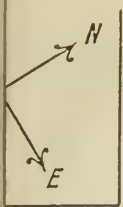
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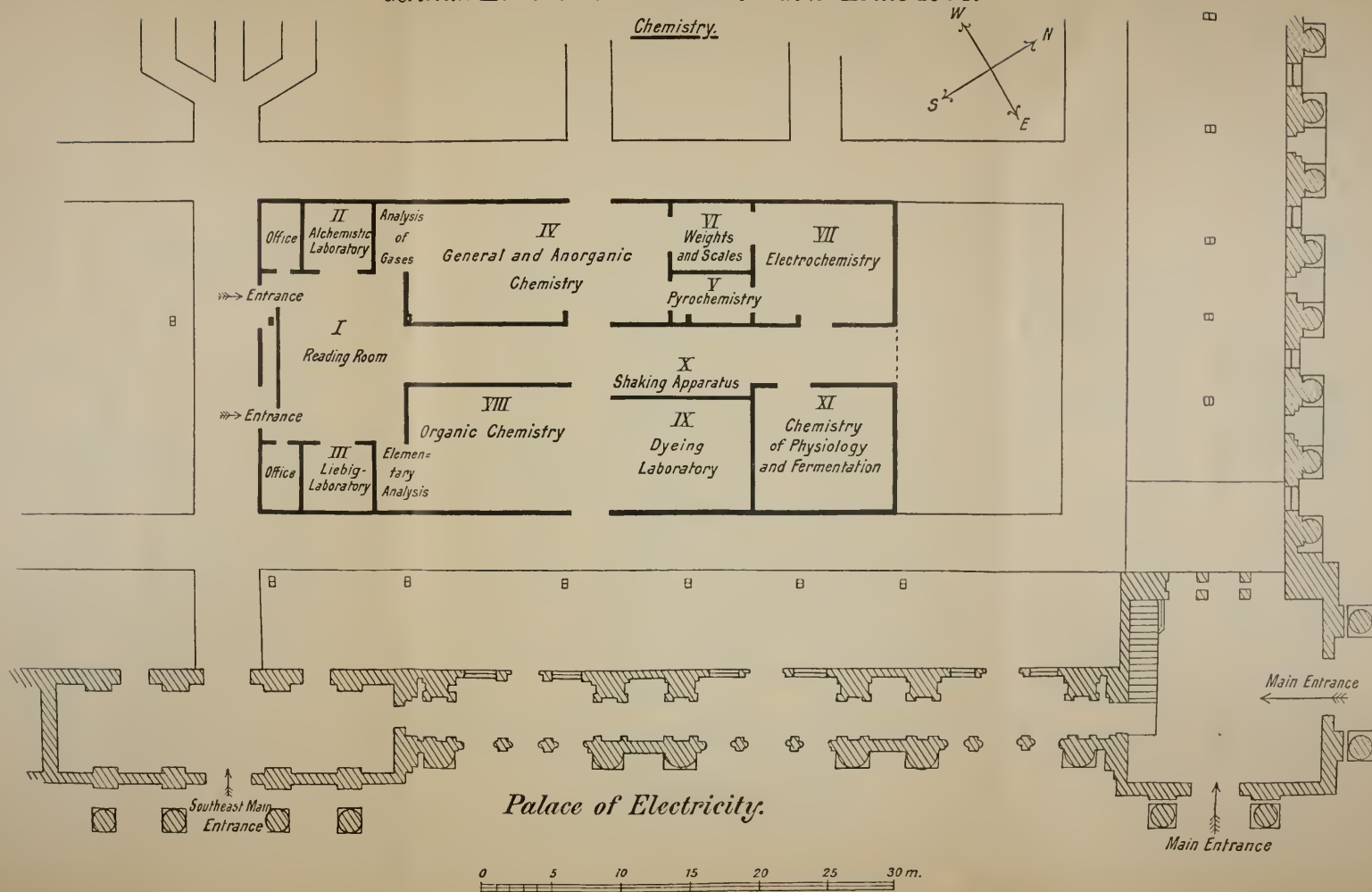


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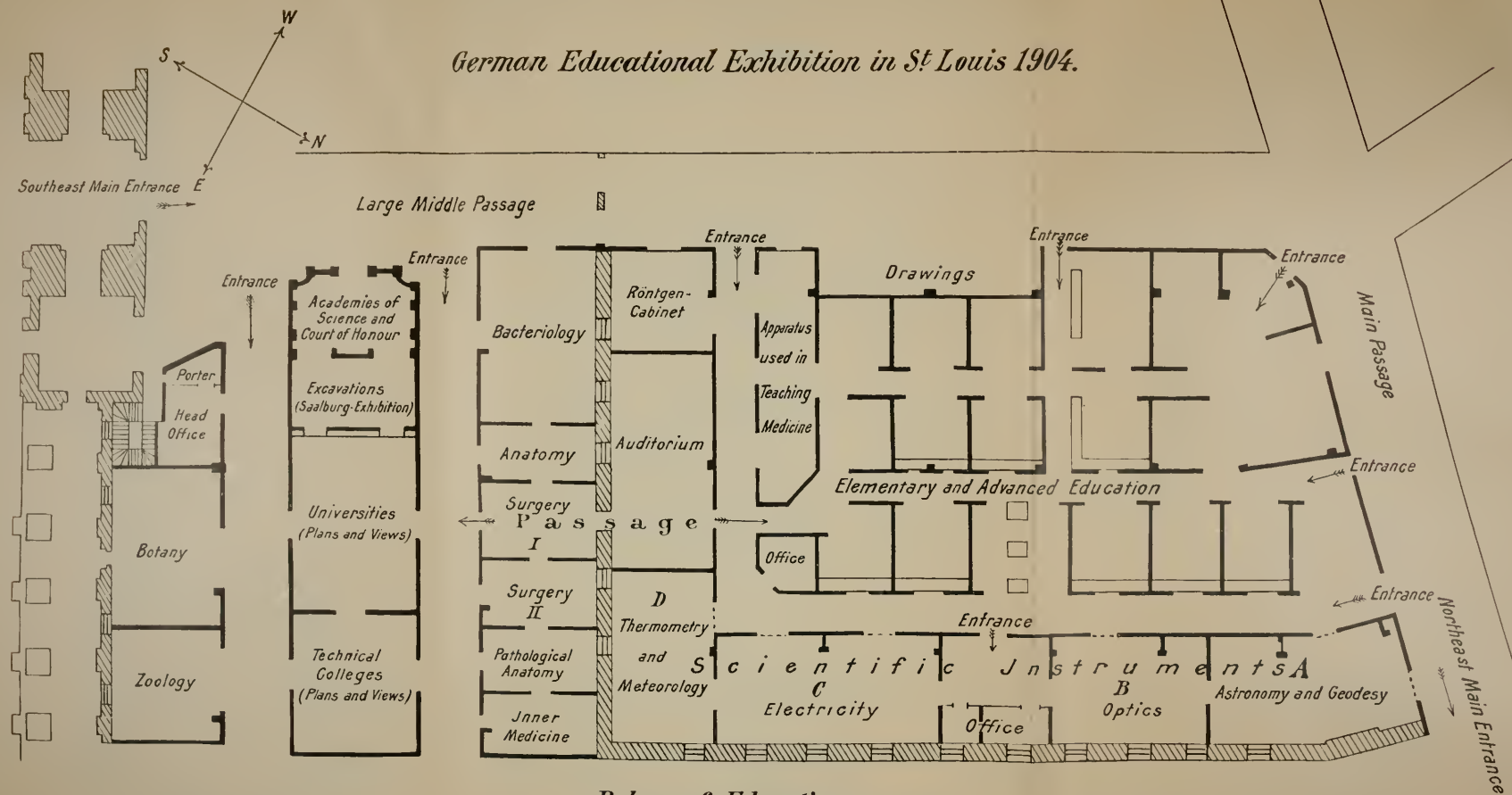
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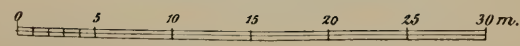
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German Educational Exhibition in St Louis 1904.



Palace of Education.



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